

Atlantic Salmon

Salmo salar

HISTORY

The Atlantic salmon, "king of the game fish," once thrived in New England streams from the St. Croix River to Connecticut's Housatonic River. The major New England salmon populations were found on the Connecticut, Merrimack, and Penobscot Rivers. By the early 1800's, however, the salmon population had been severely reduced and by the mid-1800's had essentially disappeared from its native habitat west of the Penobscot River in Maine. The construction of dams for industry, and overfishing were major reasons for the decline.

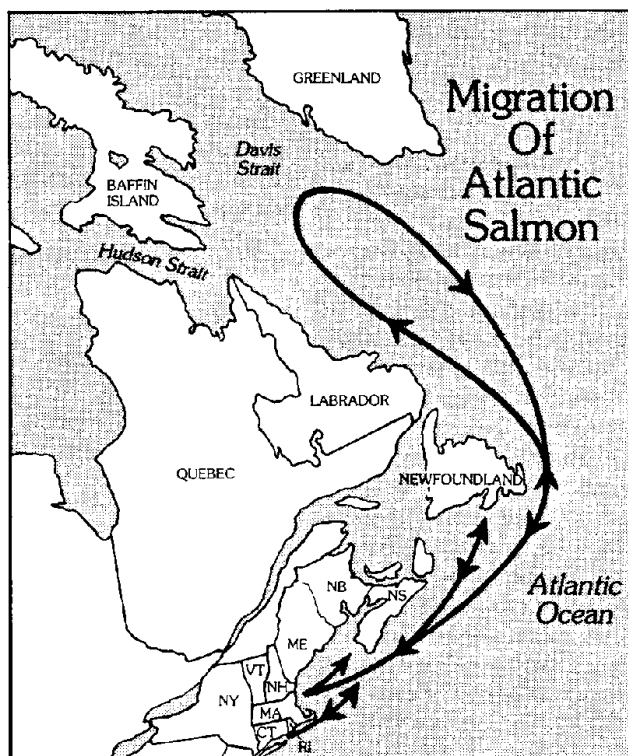
THE SPECIES

The Atlantic salmon is native to the northeastern United States, eastern Canada, and northern Europe. It is anadromous, which means that the fish migrate from the ocean into freshwater to spawn, and the offspring migrate back into the ocean to grow before repeating the cycle. Most adult salmon enter and migrate up their natal rivers in late spring, but a few migrate in early fall.

Spawning takes place in late October or November, and eggs are buried in the gravel of headwater streams. The eggs develop through the winter and hatch in late March or April. The newly hatched fish are called "fry," but as they feed and

grow, they are termed "parr." The parr spend from 1 to 2 years feeding and growing to about 6 inches in size. At this size, during the spring, a physiological change takes place in their bodies that adapts the fish for living in saltwater. The fish are now termed "smolts" and they migrate downstream to the ocean. Most of these fish then migrate north to a feeding area off the coast of Greenland. After 1 to 2 years in the ocean, the fish return to their natal streams to spawn. The cycle is repeated.

Atlantic salmon, unlike Pacific salmon, do not automatically die after spawning, though it's a wonder they don't. From the time they enter their natal river until spawning, often 6 months later, they do not feed. Nor do they start to feed again until they return to saltwater the following spring. Adults that survive the rigors of migration and spawning change from silver to a very dark color and are called "kelts" or "black salmon." Upon re-entering the ocean and commencing feeding, adults regain their silver color.



Surviving the Odds

Although a pair of spawning salmon lay about 7,500 eggs, only two of their offspring survive to spawn. In fact, only about 4,500 hatch into fry. Those fry are preyed upon by trout, herons, kingfishers, and mink. Only 50 are left by the time they are ready to migrate to the ocean as smolts. In the ocean they are preyed upon by tuna, cod, bluefish, seals, and sea lamprey. They are killed by disease, fishing, low water, and pollution. Two make it back to their home river to spawn.

RESTORATION

Through the efforts of all the New England States, private and public utilities, conservation groups, the National Marine Fisheries Service, and the U.S. Fish and Wildlife Service, salmon are once again making their upstream migrations to spawn. Restoration is occurring in the Merrimack, Connecticut, and Penobscot Rivers, and is being initiated in several smaller Maine rivers and the Pawcatuck River in Rhode Island. Salmon are reproducing naturally in some Maine rivers. Passage of the Anadromous Fish Conservation Act by Congress in 1965 provided the impetus for the long-range restoration effort.

As part of its commitment to restore Atlantic salmon in its historic habitats, the Fish and Wildlife Service conducts research and operates seven facilities for the production of over one million Atlantic salmon smolts. The Service also staffs three fishery assistance offices, and has appointed coordinators on the two interstate river systems in New England. These coordinators work with Federal, State, and private groups to develop integrated management plans on each river. As yet, the restoration program is heavily dependent on hatchery production from State and Federal facilities, which started in earnest in 1975. Since then, millions of salmon from these hatcheries have been released in rivers in which salmon had once spawned and migrated. From a single adult in 1974, Connecticut River returns of sea-run fish that were produced at these hatcheries, increased to over 500 by the 1980's. During the same period, total New England returns have increased from several hundred to several thousand adults each year.

PROGRESS IS BEING MADE

Although the Atlantic salmon had disappeared from most of its historical spawning streams by the mid-1800's, the present cooperative efforts are showing progress toward bringing the species back. Fish are now returning in small numbers to the Connecticut, Merrimack, and the Pawcatuck Rivers, where there were none 15 years ago. The Penobscot River has also shown significant progress. Some of the problems that had pre-

LIFE CYCLE OF HATCHERY PRODUCED SALMON

Egg supplies from sea-run adults have increased significantly in recent years. They are obtained from salmon that are live-trapped as they enter rivers with trapping facilities. They are then taken to special facilities where they are held and spawned in the fall.

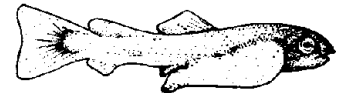
The eggs are placed in incubators with cold running water and develop during the winter.



The eggs hatch into "sac fry" (small fish that absorb the yolk sac attached to their bellies). In about 6 weeks they swim up to feed.



The fry are fed a special salmon diet and are kept in proper water temperature.



When they reach about 2 inches in length, they are known as "parr," because of the distinctive markings on their bodies. The parr continue to grow for 1 or 2 years until they become "smolts."



Silvery in color and about 6 inches in length, smolts undergo a physiological change in spring that allows them to enter saltwater and migrate to the ocean. At this time, the smolts weigh about 2 ounces; on their return from the ocean 2 years later, they weigh about 10 pounds.



In recent years, fry have also been released in an experiment to determine growth rates, based on age at the time of release. Since it has proved effective, stocking large numbers of fry will be part of the future effort to restore salmon.

self-sustaining. Large strides have been taken in this restoration effort, but there is still much to do.

Biologue Series

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